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THE JOURNAL OF PHILOSOPHY

TELEOLOGY AND TELEOLOGICAL EXPLANATION

I

EVER since Bacon likened the fruitfulness of teleological explanation to that of vestal virgins, any suggestion that phenomena might be more satisfactorily explained otherwise than by efficient causation has been suspect. This has been the case even though Bacon's empiricist successors demonstrated fairly conclusively that efficient causation, as they understood it, provided no explanation whatsoever—or at best a sort of explanation precisely similar to what Bacon deprecated. For, as E. R. Guthrie has made clear,[1] if causation is reduced to constant conjunction, to "explain" the occurrence of *B* by saying that it is caused by *A*, is to say that *A* is always accompanied or followed by *B*, or in other words that *B* occurs after *A* in this instance because it always does, which is much the same sort of explanation as that pilloried by Molière of the sleep-inducing properties of opium by the assertion that it has a sleep-inducing tendency—it always does induce sleep. It is thus the more remarkable that those who most energetically oppose teleological explanation today are usually those who most strongly support the Humian analysis of cause. But Bacon and his contemporaries were concerned with the methods of the new-born physical sciences of their day, the most triumphant of which was the classical mechanics; and this science, which rapidly became (and till the 19th century remained) the model for all, presumed the existence of a world of solid material particles the motion of which was governed by forces dependent solely upon their masses and their mutual spatial relations. From the 17th century onward, therefore, efficient causation meant mechanical causation, and what was not reducible to this kind of mechanics was regarded as to that extent inexplicable. Some thinkers, following Descartes, were prepared to admit another sphere of being of which a different sort of account was to be given—the sphere of conscious thought—but even they conceived everything else in terms of mechanical automatism, including the living bodies of animals and men. "For what," asks Hobbes, "is the Heart, but a Spring; the Nerves, but

[1] "Purpose and Mechanism in Psychology," this JOURNAL, Vol. XXI (December 4, 1924), pp. 673–681.

so many Strings; and the Joynts, but so many Wheeles, giving motion to the whole Body . . .?"[2]

Opposition to teleological explanation is thus a feature of the typical mechanistic outlook of seventeenth-century science, which, though still persistent, ceased to be so universally taken for granted after the rise of the biological sciences in the nineteenth century. The progress of biology gave rise to various forms of vitalism which sought to reintroduce teleology into nature, at least so far as the phenomena of life were concerned, and the dispute between mechanists and vitalists ensued. This in effect was a dispute about where the Cartesian dividing line should be drawn, whether so as to assimilate living phenomena to mental, or to material. But today the Cartesian dualism is obsolete, as is the classical mechanics, and the debate about teleology is consequently liable to become sterile, while the persistent opposition to teleological explanation is a curious form of atavism.

The aim of this paper is so to re-interpret the terms of the dispute as to show that its contemporary participants are no longer really at variance and that the appearance of disagreement which they maintain is largely misleading.

II

The usual objections to teleological explanation are in the main two. First, it is maintained, teleology is supposed to be the causal operation in the present of future events. A teleological process is one that is purposive and seeks a goal, so that every event in it must be explained by reference to this goal, which determines the course of the whole process. Now it is held to be impossible to understand how a future event (the goal) can causally influence an event that precedes it, and teleological explanation is therefore explanation *obscuri per obscurius*. The case of human action is understandable, so it is alleged, in terms of consciousness and intention. We are aware of our purposes and aim at them consciously, so our actions are caused not by a future event, but by our present awareness and the intention to act which we consciously form.[3] But, it is argued, teleological explanation in other cases, where consciousness may not be presumed, cannot be justified. This is the second main objection. Human action and possibly that of some higher vertebrates may be explicable in terms of consciousness, but in the case of invertebrates and lower species such explanation becomes highly dubious. When we turn to physiological processes, such

[2] *Leviathan*, The Introduction.

[3] Cf. R. B. Braithwaite, "Teleological Explanation," *Aristotelian Society Proceedings*, Vol XLVII (1946–47), p. iii.

as those of metabolism or the process of morphogenesis and phylogenesis, any account presuming conscious direction is plainly inadmissible and teleological explanation is ruled out altogether. Yet it is just in these matters that some biologists and philosophers are most emphatic in their assertion of the inapplicability of mechanical principles and most insistent upon the need for teleological description. Others steadfastly maintain that, in spite of the apparent difficulties and of our contemporary ignorance of detail, there is no sufficient reason to deny that complete physico-chemical explanations may in time be given of all biological phenomena.

Both these parties make assumptions about the nature of teleological processes which, though time-honored, are unwarranted; and when these misconceptions are dispelled and our view of teleology is suitably modified, it becomes apparent that there is no real issue between them. First, purposive behavior is taken as the model for all teleological activity, and because such activity is "goal-directed" it is assumed that the determining cause of any teleological process comes at the end. Until the process is complete, therefore, this directing cause lies in the future. Secondly, in conscious purposive action it is assumed that the prevision of this end-state is characteristic of the process and is the stimulant to action. Of course, both these assumptions have some foundation in fact. It is usually (though by no means necessarily or invariably) the case that the end-state of a teleological process is the goal at which the action is directed, but this is an accidental rather than an essential characteristic of the process. If an activity aims at a certain goal, it is liable to cease when the goal is attained, so that the attainment will mark the end of the process in time. But it is obvious (particularly in cases of failure) that the end of such a process is not necessarily that at which the activity aimed; and even when the end-state and the goal are the same, it is not the fact that it comes last in time that makes it the goal of the process, but rather some character of fulfilment or "satisfactoriness." Further, action with a conscious aim is often accompanied by the imagination of the state of affairs which the agent is trying to bring about, but, again, this imagined state of affairs is not by any means necessarily always the state of affairs in which the activity actually terminates—obviously not when the aim is not reached, and frequently not when the activity is successful. Sometimes the agent is incapable of imagining what it would be like to attain the end at which he is aiming, and may not even know clearly what it is he is trying to bring about until he succeeds; at others, he thinks of his goal only in quite general terms while he attends assiduously to the means.

Moreover, whatever sort of awareness a person may have of the goal which he seeks in purposive action, this goal is not just an event or set of events, conceived as in the future, toward which the agent is being drawn by some mysterious kind of gravitation. It is something which, by his own effort and activity, he is engaged in bringing about. The event is not conceived as occurring or at all liable to occur in the future without his active participation. It is part and parcel of his activity, and his activity of it. In a sense, his activity is the goal in the making, and the goal is what his activity is all the time generating. For instance, the activity of an author writing a book is not related to its final product externally as means to end. The book is the entire "work," and the whole process of activity generates and is summed up in what the publisher eventually distributes in print. Consequently, it is misleading to represent the process either as caused by a *future* event, or as caused by a present conscious intention without reference to the future. It is much more truly described as a process in which the outcome is all along immanent and potential, or through which the final state is being generated or is generating itself. This, no doubt, is a kind of description which could equally well be applied to many physico-chemical processes by which some end-state is brought about; but we are here assuming that the difference from this of conscious purposive activity is that, in it, the agent knows that the result depends upon his action and is deliberately striving to produce it. In a physico-chemical process we are not entitled to presume a conscious bond between cause and effect. Inorganic action, we may say, proceeds according to law, but conscious purposive action according to the idea of law. It is the deliberate use of the knowledge of laws in order to bring about desired effects, as when a scientist or engineer uses his knowledge of physics and chemistry to construct a guided missile.

It is clear, then, that to appreciate the peculiar character of teleological activity, if human purposiveness is taken as the model, we must first consider the special character of the model, in particular the relation between the agent and the end, and those properties of the goal in virtue of which it appeals to the agent as worthy of pursuit.

III

It would seem that some sort of conative impulse is essential to all purposive action and this is provided by animal appetite. We are apt to say that appetite is "blind"—a sheer felt want which impels to activity aimed at its removal. Its object is, as John Locke holds, the removal of the uneasiness occasioned by the feeling of want. The extent to which, when actuated by appetite, we know

what we want need not here concern us. Collingwood maintains that we do not, and that that is why appetite is blind[4]; but it is admittedly conscious, nevertheless, so far as it is felt. At the stage at which the want is known as such and its object recognized, we have desire, the explicit awareness of an object to be sought, in the attainment of which satisfaction is to be reached. This is a transformation of appetite in the light of self-consciousness, for to desire an object we must have become conscious of ourselves as seeking satisfaction in it. We are not here called upon to consider by what process of mental development self-consciousness is reached. It is sufficient for our present purpose to note that unless I am aware of myself and my feelings, as mine, I cannot conceive of an object as affording me satisfaction, and I cannot therefore desire it as that which will satisfy *me*. Without self-consciousness, therefore, desire is not possible, though appetite certainly is. Now it is common experience that our appetites are many and various and they are not always mutually compatible, so that our effort to satisfy one may run counter to the impulse of another. At the bare appetitive level this results in either the obliteration of the weaker by the stronger or an uneasy alternation between the two. But at the level of desire this tug-of-war, though it survives as an element or moment in experience and is still felt, is transformed by our awareness of the objects and of our desire for them into deliberate choice. We choose, when faced with alternative desirable objects, what we think will give us most satisfaction. Choice thus involves a grasp or view of two or more possibilities, an appreciation of their compatibility or incompatibility, and an estimate of the extent to which the adoption of any one, or of any combination of compatibles, will give us satisfaction.

The apprehension of our feelings and desires as our own and the activity of reviewing, comparing, and setting them in order of preference is what I regard as the typical work of thought. It organizes our desires and directs our energies to the pursuit of their objects in such a manner as to attain what, through its activity, we anticipate as total satisfaction of the person. Nothing less than this is involved in conscious purposive action, for objects are consciously (or deliberately) pursued only as contributory to the satisfaction of the self, not simply (as in appetite) from an urge to remove a feeling of want.

Because desires frequently conflict, even in a single agent, and because no single agent can satisfy very many, let alone all, of his desires without the assistance of others, the satisfaction of the self as a whole involves a complex and often arduous process of organi-

[4] *The New Leviathan*, 7.5.

zation—what we normally call moral education—in which some kinds of activity are given up altogether as wholly incompatible with those from which the fullest satisfaction is expected; others may be postponed as incompatible with what is temporarily more urgent; others, again, may be admitted but only when more important alternatives are not pressed; while some will be regarded as always necessary and constantly to be preferred to alternatives. The final result is a system of activities, or a way of life, which is found to be the most satisfactory on the whole, and the maintenance of which is our over-ruling aim. It is a system which involves our social activities and so intertwines our lives and actions with those of others, and which provides for us the criterion by which we judge the value of possible actions and their objectives, and consequently is the directive of choice.

Conscious purposive activity, therefore, is not impelled by any simple force or drive towards a simple object, simply imagined, nor is it drawn magnetically towards some single event or state of affairs to occur some time in the future, but is the continuous endeavor to maintain, in a self-conscious personality, a dynamic system of activities and satisfactions which are continuous with a corresponding system of human social relationships. It is to be observed that the objects which these activities pursue are satisfactory, on the whole and in the long run, only to the extent that they maintain the system; for so far as they do not, so far as they run counter to it, they tend to be self-frustrating. And it is only the pursuit of objects chosen for the sake of maintaining such a system that ranks as conscious purposive action. For in the course of organizing our desires in the manner described, we come to transfer them, with varying success, but often wholly, from objects which do not maintain the system, to objects which do, and to regard *only* the latter as in a proper sense desirable.

It is, therefore, this property of being a special sort of system or whole, or of contributing to, or being an indispensable part of, such a system, which renders the objects of conscious purposive action satisfactory; and the aims of such action are not "ends" in the temporal sense of finality, because the real and ultimate aim is the persistent maintenance of the system. The activity is not simply a linear process terminating in a state of satisfied quiescence, but a continuous activity, all of which is intrinsic to the satisfactory state of consciousness desired, so that it is at one and the same time both means and end. Our common substitution, in ordinary discourse, of the word "design" for "purpose" or "aim" supports this view of purposive action. A design is a plan or pattern, a systematic arrangement of parts or elements; but we use

the word with equal propriety of the aim of deliberate action. The object sought is its aim so far as it fits into a plan and is itself or contributes to a design or pattern. So we say of such action that it is done "by design," and we rank it as teleological.

Some may object that I have chosen conscious activity at too sophisticated a level and given too complicated an account of purpose to serve as a model for teleology. But this objection is not admissible, for anything less than I have described would not be deliberate action and so could not without reserve be described as consciously purposive. Merely impulsive or appetitive behavior might plausibly be attributed wholly to physiological process, and our consciousness of it might be regarded as purely epiphenomenal. If we were to assert that it was purposive and take it as a model for teleologically explicable processes, we should then be begging the question. But only the most fanatical materialist would attempt to maintain so unplausible a doctrine as that our awareness of what we are about when we act from deliberate choice is merely an epiphenomenal accompaniment of physiological process. Here we can admit without reserve the appropriateness of teleological explanation, and so we can, with justification, extend such explanation to cases which bear relevant and significant resemblance to our own deliberate action.

The characteristic feature of such action is its high degree of variability in the maintenance of a constant and uniform direction. The aim or objective dominates the entire process, regulates its changes, and determines the alternative courses open to the agent. When the activity meets with obstacles, or is thwarted by the counter-activity of other persons or of inanimate things, it is consciously modified so as to pursue one of the alternative courses open to it. Its variability is thus never random, but is governed by the relevance of the means to the end and is systematic. The end, moreover, as we have seen, is never a simple object, but always an element or factor in, or is the whole of, a more or less complex and systematic structure of objects and activities; and the principle on which this structure is organized is, in the last resort, the same as that which governs the variations in the activities seeking to construct or maintain the system. The aim of the activity serves, in consequence, to explain it. When a man's behavior puzzles us, it is because we cannot see the systematic relevance of its variation to any governing principle or design. But once we discover what it is he is trying to bring about, we are apt to say, "That explains everything." Similarly, our own and others' conduct is held to be reasonable when we can see how it is planned, how it is appropriate to a systematic objective that it is bringing into being, or

a systematic state of affairs that it is trying to maintain. And in such cases no other sort of explanation will be adequate. It is no answer to the question what a man is about, who is groveling on the floor of his bedroom, to say that various chemical processes are going on in his body and impulses passing along his nerves, causing his muscles to relax and contract in specified ways; whereas to say that he is dressing for dinner and has lost his collar-stud makes all clear. So *if* a process is teleological in the sense described, no explanation will be complete which omits the principle regulating its variations and its course as a whole, or overlooks the structural totality of which it is the generation.

IV

Teleological explanation, therefore, is not explanation in terms of an end-state, or of a cause which succeeds its effect in time, but is explanation of parts in terms of a whole, or processes in terms of a dynamic system to which they belong, which they are maintaining, or which is being generated through them—a system the principle of organization of which is the governing and directing principle of the processes to be explained. Whether such explanation is admissible in any particular case, and whether any other sort of explanation (e.g., one solely in terms of efficient causation) is sufficient, will depend upon whether the explicandum has a character that is thus dependent upon some sytematic totality or structure.

The claim is made by many biologists and some philosophers that all biological phenomena are of this sort, that they can, therefore, be adequately explained only teleologically, and that any explanation in merely physico-chemical terms must, in the nature of the case, be incomplete, however far-reaching it might be in detail. Others, who are strongly supported by other philosophers (more influential in these days), repudiate the claim, and argue that nothing in the nature of biological phenomena warrants the belief that physics and chemistry are in principle incapable of accounting for them all. The former party seems sometimes to assume gratuitously that physico-chemical explanation is always confined entirely to the explication of efficient causes, or even that it must inevitably be explanation in terms of something like the classical mechanics. The latter party, on the other hand, is apt to support its case by showing that modern physics and chemistry have adopted principles and evolved theories which explain physico-chemical phenomena in terms of systematic wholes and might therefore be extended to cover biological facts, though they often confess that to do this adequately our present knowledge is insufficient and new laws and theories would probably be needed. In short, the first

party is protesting against a mechanism that is no longer scientifically current, and the second party, insofar as they seek to repudiate teleology, are neatly giving away their case. I shall try to show that the first are right in what they affirm of biological phenomena, and the second are wrong in what they deny.

The account I have so far given of teleology makes it immediately apparent that it involves no reference to, nor any need to postulate, metaphysical entities such as Driesch's entelechy or Bergson's vital force. There is, therefore, no call to discuss this form of vitalism, which today finds little if any support. On the other hand, so far as I know, biologists, almost without exception, maintain that organization is the special characteristic of living matter and its behavior. "It is not the *character* of the constituents of a living thing," writes Dr. E. W. Sinnott, "but the *relations* between them which are most significant. An organism is an *organized* system, each part or quality so related to all the rest that in its growth the individual marches on . . . to a specific end or culmination, maintaining throughout its course a delicately balanced state of form and function which tends to restore itself when altered."[5] And he quotes in support a number of other biologists, by no means all of them in any sense "vitalists." Some, however, have claimed, on the strength of this organized character of living matter, that biology is an autonomous science with laws of its own, that these laws cannot now and never will be reduced to physico-chemical laws, even though they confess that the chemist and the physicist have much help to offer in the investigation of biological facts. Now, if my interpretation of teleology is correct, then it would follow that living matter and living activity, so far as organization is its dominant characteristic, could only be fully explained teleologically, and, if physico-chemical accounts of it were such as to omit or obscure its organized character, they would omit and obscure the very features that had to be explained. If, however, organization itself is explicable in terms of physics and chemistry, and if physico-chemical laws and theories are evolved introducing principles of organization even in the inorganic sphere, then biological phenomena might be adequately explained in physico-chemical terms without the explanations ceasing to be teleological.

Description of a few examples of biological phenomena may help to show, first, that they are cases of what I have called teleological activity, in as much as they are systematically organized or are proc-

[5] E. W. Sinnott, *Cell and Psyche* (Chapel Hill, 1950), p. 20. He quotes, in support, E. B. Wilson, J. H. Woodger, Herbert Muller, W. B. Cannon, R. G. Harrison, and Joseph Needham.

esses which generate or maintain systematically organized structures, in as much as their course is regulated and directed by the system they are constituting, and is capable of relevant variation over a wide range. It may help to show, that, in such phenomena, what primarily demands explanation are just these characteristics consequent upon the wholeness and integral nature of the system and its control of the processes which generate and subserve it. Consequently, any form of explanation that fails to reach this organic character fails of its object as explanation.

I shall take as my first example the life of the slime-mould, a lowly creature which shows little evidence of organization to the casual observer. The creature consists of a formless mass of protoplasm containing numerous scattered nuclei and contractile vacuoles, but otherwise undifferentiated (except so far as the biochemist discovers protoplasm to be an organized substance). It is not divided into cells but is like an enormous protozoon reaching up to a square foot in area and two inches in thickness. It creeps along with a slow backward and forward motion, stronger in one direction than the other, so as to amount to locomotion. "Nevertheless," say G. P. Wells and Julian Huxley (on whose account I am basing my description),[6] "it creeps with an appearance of appetite and purpose," turning aside to flow over and engulf any attractive lump of food. Such a mould can be "strained" by being forced through dense cotton wool, so that in the process its substance is divided into a multitude of fine parallel strands; but on emerging these will coalesce again to form a continuous living mass. In unfavorable drought conditions a slime-mould will transform part of its substance into a horny crust, forming it into a number of separate hollow capsules each housing a portion of the protoplasm of its body. These can remain motionless and without external sign of life for up to three years and, when favorable conditions return, the hard capsules are absorbed, their contents flow together again, and the slow creeping activity is resumed. At a certain stage of its life-history the slime-mould suddenly humps itself at intervals into wartlike knobs, which grow upward into stalks, solidifying at the core by hardening their own substance. The fluid protoplasm climbs up these stalks and at the top elaborates itself into vessels shaped, according to the species of slime-mould, spherically, cylindrically, or like tiny umbrellas. These are the sporangia. They have hard outer shells filled with the spores and a tangle of minute coiled fibers, which, when the shell bursts, act as springs and propel the spores outward into the

[6] Cf. *The Science of Life* (London, Cassell, 1938), pp. 300–304.

surrounding space. Each spore, if it falls in a damp place with a suitable food-supply, hatches out a microscopic protozoon with its own means of locomotion, which, whenever it meets another of its own kind, fuses with it until the composite living mass grows to the size described above.

The full account of this creature shows it to be, despite frequent appearances to the contrary, an organized structure, or one inherently capable of becoming organized at the appropriate time. Its activity varies always relevantly to the maintenance of its life and constitution. It pursues food; it encysts when food and moisture fail; it elaborates itself into organs for the purpose of reproduction, and its infant protozoa unite to form a single mass always behaving so as to preserve a typical character. Its very appearance of formlessness is belied by its organic behavior. To *explain* its conduct what we have to do is to explain its organization—how a slimy gelatinous mass is capable of differentiating itself into delicately stalked and shaped sporangia at just the appropriate time—how it is capable of directing its course towards morsels that it can ingest, absorb, and from which it can renew its substance—how it succeeds in distinguishing nutritious from innutritious matter, and so forth. The answer to these questions would have to be teleological in the sense we have adopted; and though that would not necessarily exclude physico-chemical terms, yet, if we could distinguish and minutely describe the physico-chemical processes involved, that would help us only if it enlightened us as to the source and nature of their organization.

A second example is provided by the growth of a conifer, of which the central shoot grows vertically upward to become the trunk of the tree, while the lateral shoots grow almost horizontally and form the branches. The branches grow more slowly than the trunk, but their rate of growth is maintained in a constant ratio so that the conical shape of the tree which results remains constant. If the top of the central shoot is cut off, one of the lateral arms swings upward to take its place, its rate of growth increases, and its relation to that of the other branches is accordingly altered. Here, again, we find a typical organization governing the process, reasserting itself when disturbed and maintaining its structure by regulating appropriately its constituent factors. Here, again, the activity is not simply uniform but is varied, according to circumstance, relevantly to the system to be preserved.

Even more typical examples can be found among the numerous phenomena of regeneration. If a flatworm is cut in half, the head end will grow a new tail and the tail end a new head. If it is cut into three pieces, the middle piece will regenerate both head and

tail. If the segment is irregular in shape the new parts generated assume suitable spatial relations so that the normal shape of the creature is restored. If the worm is cut longitudinally, the half worm will regenerate a symmetrical other half, reducing in size as its tissue provides the requisite material for the regenerated portion. Polyps and sponges can regenerate new individuals out of almost any sort of fragment of old ones, so long as the cells remain intact; in fact, a sponge rubbed through fine silk, so as to be disintegrated into single cells or very small groups of cells, can reorganize itself into a normal creature again out of its disorganized parts,[7] or, alternatively, each cell or tiny group will grow and form itself into a new and perfect miniature animal.[8]

Physiological processes characterized by what is called homeostasis, where a complex of chemical or mechanical processes (or both) is constantly varied so as to maintain some "steady state" in the organism, are outstanding examples of the same sort of organized and relevantly variable integration of heterogeneous parts and functions into a single typical whole. Examples are familiar and plentiful, and I need not do more than mention one or two. Haldane has made famous the case of respiration and the varying means used to keep the carbon-dioxide and oxygen pressures constant in the lungs. The chemical action of the liver in regulating the supply of sugar in the blood varies according to the amounts of different substances made available by the digestion of food. The action of the heart is regulated in complicated ways in order to adjust the blood supply to various parts of the body in differing circumstances of heat, cold, exertion, fatigue, and the like.

In all such cases, what I wish to underline is that they are analogous to conscious purposive action in that they constitute and actively maintain a complex system by a process of relevant variation. So much is this the case that even the most tough-minded of scientists is liable, in his description of them, to give way to anthropomorphic language and metaphor. Describing the growth of the embryo, Wells and Huxley, for instance, speak of the egg as "making up its mind" which part will be right and which left, which front and which back.[9] Sinnott, in a similar connection, says, "Here is no random process but a steady march, each event in step with the rest as though to a definite and predetermined end. One gets the impression of some unseen craftsman who knows what he

[7] Cf. Sinnott, *op. cit.*, p. 27.
[8] Cf. Wells and Huxley, *op. cit.*, p. 512.
[9] *Ibid.*, p. 579.

is about and molds the mass of growing cells according to a precise plan.'' [10]

What in these biological phenomena requires explanation is their simulation of conscious purpose, not merely their physico-chemical details. In other words, it is their organized character. It is highly doubtful if that could ever be explained without knowledge of their physico-chemical character, but it is quite clear that it could not be explained by any physico-chemical analysis which dissipated the systematic interrelations. One which did not do this would have to be at least as much a synthesis as an analysis and would have to rank as teleological, whether given purely in physico-chemical terms or not.

The obvious organic form of biological phenomena has induced many theorists to insist on what they call an ''organismic'' approach in biology, and, while they acknowledge the value of the work of the bio-chemist and bio-physicist, to declare that mere physico-chemical explanation, so far as that is merely ''mechanical,'' is, in principle, inappropriate to biology. The extent to which they are right has now been sufficiently indicated; but the door must be kept open to the possibility, on which only future research can throw light, that physico-chemical facts and processes may themselves be facts of organization, so that the explanation of organic phenomena in physico-chemical terms would then be as little ''mechanistic'' as any other.

V

On the other hand, some contemporary philosophers have submitted the views of the organismic school to severe criticism; but they seem, for the most part, either to ignore the significance of the systematic character of the facts to be explained, or to propose possible types of physico-chemical explanation which are still in essence teleological (for they are admitted to involve holism of some sort). Professor R. B. Braithwaite, in a presidential address to the Aristotelian Society some years ago,[11] distinguished precisely between cases in which teleological explanation was useful and cases in which it was otiose. He agrees with E. S. Russell that persistence towards a goal in varying circumstances is what distinguishes teleological processes, but he admits that ''it is impossible to find any characteristic of the final state by itself of any teleological causal chain which is general enough to cover all goals of goal-directed actions and yet specific enough to differentiate

[10] Sinnott, *op. cit.*, p. 24.

[11] ''Teleological Explanation,'' *A. S. P.*, Vol. XLVII (1946–47).

such actions from other repeated cycles of behavior," and that therefore it is necessary "to look at the whole causal chain and not merely at its final state." Here there is an indication that Professor Braithwaite dimly discerns the distinguishing feature of teleological action (as opposed to other non-teleological cycles of behavior) to be not just its persistence towards an end-state, but some characteristic of the whole causal chain. In an elaborate symbolic analysis he defines the variancy of a teleological goal-directed sequence as the class of all those sets of field conditions (i. e., causally relevant factors in the environment of the system under consideration) which are such that every causal chain with the given initial state and determined by one of these sets attains the goal expected. He says that we may obtain our knowledge of this variancy in either of two ways: deductively from known causal laws, or else inductively from knowledge of previous sets of field conditions under which similar causal chains have attained the goal. Thus we may reasonably predict "that there will be a goal attaining chain in the system." In the first case, he says, teleological explanation would be futile, for, in effect, physico-chemical explanation would already be available; but in the second case, where this is not so, teleological explanation (i.e., in terms of the goal attained) is useful and appropriate. Cases in which our knowledge of the variancy can be deduced from known causal laws are such as the behavior of guided missiles or pilotless planes.[12] The maintenance of the body-temperature in mammals is an instance of goal-directed action which can be predicted only on inductive evidence.

Here we must notice three points: (i) the holistic character of the goal-seeking process is recognized and admitted; (ii) nevertheless, the case of the machine and the explanation of its behavior is not regarded as teleological; and (iii) the presumption is made that biological processes might, with further scientific progress and more knowledge of detail, be reduced to cases in which teleological explanation was unnecessary. But the difference between the behavior of a guided missile and one moving freely under the influence of gravity and wind pressure is precisely that the former is governed by an elaborate system of mutually adjusted mechanisms *designed* to keep it on its course, which the latter lacks, and our physico-chemical account of it never explains the source of this organization. For that we should have to resort to the fact that the missile had been deliberately so constructed by man, and this would be an explanation in terms of conscious purpose. The system of mechanisms which maintain the mammalian body-temperature, so far as

[12] *Ibid.*, p. xii.

we know, is designed neither by the mammal itself nor by anybody else; yet it is its simulation of deliberate purposive action that has to be explained. For this it is not sufficient simply to be able to predict that there will be a goal attaining chain in the system. What is needed is to understand how this is possible. If this is understandable at all it can only be in terms of organization, and Braithwaite should have concluded, therefore, that teleological explanation would be appropriate in both classes of cases which he describes. Neither can properly be explained in any other way.

Moritz Schlick, in his "Philosophy of Organic Life,"[13] argues in the main against entelechies and vital forces with which we are not concerned. He contends, however, that finalism—i.e., goal-seeking—does not distinguish the organic from the inorganic, and he cites the principle of least action as a purely physical example of the determination of a process as much by its end as by its beginning.[14] He might have given several other such examples from physics, of which not the least significant is Pauli's principle of exclusion. But these are evidences of teleological explanation in physics, not of the possibility or appropriateness of any other sort of explanation in biology.

Perhaps the most constructive and formidable critic of organicism among contemporary philosophers is Ernest Nagel, who attacks the belief that biological phenomena are irreducible to physico-chemical and their explanation to the laws of physics, by arguing that this belief is disposed of once it can be shown either that biological concepts are definable in purely physico-chemical terms, or that biological laws are derivable from physico-chemical laws, or both. He admits that in the present state of our knowledge neither is altogether possible, but refuses to believe that both may not be possible at some future date. There is no evidence, he maintains, that such derivation is impossible in principle. The arguments which he confesses to be the most weighty in support of the irreducibility of biology to physics are mainly three: (i) those which stress the goal-directed character of biological processes; (ii) those which point to hierarchical order in living things; and (iii) those which stress the wholeness of the organism—which maintain that, in biology, the whole is more than the sum of the parts. But he finds none of these arguments conclusive in establishing the claim, as he puts it, "that the mode of analysis required for under-

[13] Reprinted in Feigl and Brodbeck, *Readings in the Philosophy of Science*, pp. 523–536.

[14] *Ibid.*, p. 530. It is interesting to note that Max Planck uses the same example as evidence from physical science of the existence of God. (See *Scientific Autobiography, etc.*)

standing living phenomena is fundamentally different from that which obtains in the physical sciences."

Precisely what this mode of analysis is Nagel does not tell us, but his language strongly suggests that it is a sort of dissection, or taking to pieces, which renders a complex intelligible by examining each of its factors separately. This, I say, is suggested by his language, but it is belied, as we shall presently see, by the account he gives of the conditions of biological explanation. Indeed, the use of the word "analysis" as more or less synonymous with "explanation" is misleading and question-begging where what has to be explained is the integration of an organized whole. In fact, no explanation is ever purely analytic, for it always involves at once both the distinction and differentiation of parts within some complex, and the illumination of the way in which they are interrelated and unified. All explanation is at once analysis and synthesis.

Let us examine in turn Nagel's criticism of each of the three main arguments for teleological explanation.

(i) With respect to goal-directed behavior, he first maintains that the construction of machines which, in varying degrees simulate it, proves that there is at any rate no absurdity in regarding goal-directed activity as possible for purely physico-chemical systems. But this argument, as I have already pointed out, overlooks the deliberate planning and construction of the machines by man to make them self-regulating or self-maintaining to the extent that they are, and its force, therefore, is the opposite of what is intended so far as it implies that some physico-chemical systems require teleological explanation rather than that biological ones might not. More formidable is Nagel's elaborate attempt, by a symbolic formulation of the nature of goal-directed behavior (similar to but more complex than Braithwaite's), to show that it can be adequately described without recourse to teleological explanation—that is, "without invoking purposes and goals as dynamic agents."[15] However, I have already asserted that, properly speaking, teleology is not the dynamic agency of goals and purposes, if by these terms are meant simple events occurring in the future. If, however, they mean the actualization of an organized system, then it is doubtful whether Nagel's argument proves his point, for he assumes a system differentiated into a number of parts such that their activity jointly and severally is relevant to the maintenance of a certain property of the system, which he calls G (e.g., the body-temperature of a mammal). Each of these parts is variable in state and they

[15] "Teleological Explanation," in *Vision and Action*. Reprinted in Feigl and Brodbeck, *Readings in the Philosophy of Science*, pp. 546 and 550.

are so connected that, when the state of one changes so as to alter the property to be maintained, the others change concomitantly and in such a way that the property is, by their joint causation, restored. The first change of state he calls a "primary variation," and the concomitant changes of the other parts of the system, "adaptive variations." The conjoint state of the parts producing the constant property is said to be a *G*-state. It is merely assumed that the system is so constituted that the state-variables of the parts will compensate one another and (within certain more or less wide limits) always produce a *G*-state. It is then claimed that the "conditions for a directively organized system" have been stated "in a manner not requiring the adoption of teleology as a fundamental or unanalysable category."[16] It is to be observed, however, that these conditions do not include the factor, whatever it might be, that determines the adaptive variations and causes them *to be adaptive*, or what one might call *G*-determining. We are simply asked to assume a system that is so constituted. Clearly, its constitution is intricately organized in order to bring about this result, and it is the maintenance of this organization that the *G*-state represents. Consequently, if the self-maintenance of a complex organization is what constitutes teleological activity, teleology has not been eliminated. This, in effect, Nagel himself admits when he says that teleological explanations "view the operations of things from the perspective of certain selected wholes to which the things belong; and they are therefore concerned with properties of parts of such wholes only in so far as these properties are relevant to some complex features or activities assumed as characteristic for those wholes."[17] Moreover, as this complex structural character of the system is merely assumed to be such as will maintain itself by the relevant adaptive variations of its parts, it has not been at all "analysed" or explained, and therefore teleology is still required as an apparently unanalysable category.

Moreover, Nagel's elaborate symbolic description fits, with equal elegance, both activities which are known to be consciously directed and those which are not. It does not preserve the distinction between what is generally acknowledged as purposive behavior and what is only claimed as such because it proceeds *as if* it were consciously directed. Accordingly, it justifies our regarding both or neither as teleological. In fact, this symbolic account tells us nothing more than that if a system is so organized as, persistently and in widely varying conditions, to maintain a certain property, it is a

[16] *Ibid.*, p. 549.
[17] *Ibid.*, p. 553.

goal-directed system. This we already knew to begin with and the substitution of numerous mathematical symbols for ordinary words does not alter the position; though there is danger that it may bamboozle the innocent and unwary.

(ii) The claim that hierarchical order is distinctive of teleological system, Nagel meets by pointing out that this is to be found in physico-chemical systems as well as in biological organisms. It is, therefore, no obstacle, he contends, to the reduction of biological facts and explanations to physico-chemical ones. But here he seems to have missed the point of the organicist argument. That is, first, that any sort of organization requires a special form of description and a special type of law to account for its attendant phenomena. Secondly, organisms are hierarchically organized with physico-chemical systems at the base of the hierarchy. Thus the difference in the sort of law which will explain phenomena low in the hierarchy, from that which will be required for those at a higher level, is to be accounted for in terms of the increase of organized complexity, which is, so it is claimed, accompanied by a corresponding increase in organic integrity. Consequently, the fact that physico-chemical systems may be hierarchical in their structure would not necessarily permit the reduction of laws applicable at higher levels to those applicable lower down, even if it could be shown, as it has not, that this is the case within physico-chemical hierarchies.

(iii) The argument that the whole is more than the sum of the parts Professor Nagel finds obscure, and he again suggests a symbolic interpretation which I shall paraphrase as follows: If the behavior of a set of individuals, forming a closed system, with respect to their manifesting a certain class of properties, can be explained by a given body of theory, which can similarly explain the behavior of another set of individuals, forming another closed system and manifesting the same class of properties, and if the behavior of these sets of individuals, when together they form part of a wider closed system, cannot be explained by laws derived from this given body of theory, then we should say that the whole is more than the sum of the parts; but if their behavior when members of the larger system *can* be explained by laws derived from the given body of theory, the sum of the parts is equal to or is the same thing as the whole.

The example that Nagel gives of the first case is rather inept. The kinetic theory of gases, he says, was able to explain certain of their thermal properties, but was not similarly able to explain the same class of thermal properties in solids. This example, however, does not seem to fit the model, for when the molecules of a gas

are brought into a state of aggregation characteristic of a solid they do not form part of a wider system in conjunction with another set of individuals, but merely themselves constitute a new system under different conditions. The ineptitude of the example, however, does not affect the argument which follows, for, no doubt, better illustrations of what Nagel intends could easily be found. For instance, the typical absorption curve obtained from proteins when examined under the ultra-violet spectrometer is not obtained when these same proteins form part of the living cell of a sea-urchin's egg, though if the egg is killed, the characteristic protein curve appears.[18]

Nagel points out that the distinction between wholes which are and wholes which are not the sums of their parts is relative to some assumed body of theory, so that what may be more than the sum of its parts relative to one theory, may not be so relative to another, and though it is true that there is now no body of physico-chemical theory from which the behavior of living organisms can be deduced (even if the behavior of some of their parts can be so deduced), there is no reason to believe that the development of a body of theory which will explain organic behavior physically and chemically is *in principle* impossible.

But what this reasoning proves is no less than that the behavior of the parts of a complex system is explicable only in the light of, and only by taking into account, the organization of the whole system. If a body of theory, which can explain the behavior of two sets of individuals each forming a closed system, cannot explain their joint behavior in a larger system, this is because it does not take the organization of the larger system into account, whereas a body of theory which did this might explain all. In short, the new body of theory (relatively to the old) would have to be *organismic*. All that is meant by saying that the sum of the parts falls short of the whole is that the behavior of the parts, taken severally and in isolation, is not the same as their behavior when organized together, and that if the latter is to be understood, it can be only by reference to the total system of organization. There are purely physical systems in which this does not seem to be the case; for instance, the dynamics of an aggregate of material points is directly derivable from the laws of dynamics governing the motion of a single material point (or at any rate a single pair). This, however, as Nagel would probably maintain, is relative only to the classical theory of dynamics, and for all I know, may not be the case in the light of the theory of relativity. In biology, on

[18] Cf. Joseph Needham, *Order and Life* (Yale, 1936), pp. 118–119.

the other hand, we constantly find that the behavior of the several parts of an organism, though regularly describable in one way when they are regarded singly and in isolation, is liable to modification according to variations in the way they are mutually interrelated in the living creature. Thus, particular cells in the developing embryo normally form certain tissues or organs; but if the embryo at an early stage in its development is cut in two, or when the cells are separated from the rest of the system, they develop entirely differently. It is therefore necessary to know the character of the whole system before we can predict the behavior of the several parts, and it is not possible, from mere addition of the normal behavior of the parts taken in isolation, to predict their behavior in the system, or of the system taken as a whole.

Of course, it does not follow that Nagel is wrong in his contention that what we here require is a new and more comprehensive body of theory; but this new type of theory, we may more than suspect, will provide explanations which are teleological. The fact that this has already proved to be the case in quantum physics only goes to show that the point at issue is no longer whether mechanism or teleology is more appropriate, but is a question of the sort of whole with which we are dealing and the degree of its complexity.

Nagel's next point has a similar bearing. He reminds us that no theory, physical or other, "can explain the operations of any concrete system unless various restrictive or boundary conditions are placed on the generality of the theory." Consequently, when we set out to explain by physico-chemical laws the behavior of certain parts of the organism as they function within its total system, the boundary conditions within which the theory holds have been violated. "Accordingly," says Nagel, "a necessary requirement for the explanation of the unified behavior of organisms is that boundary and initial conditions bearing on the actual relations of the parts as parts of living organisms be stated in *physicochemical* terms." But this demand for appropriate boundary conditions is simply a demand that the system as a whole be taken into consideration. It is, in short, a demand for what I should wish to call a teleological explanation—one in terms of the maintenance of a total organized system. If it were possible to state it in physico-chemical terms, this would not alter its teleological character. But it is admitted on all hands that the physico-chemical knowledge now at our disposal is insufficient, and present physico-chemical theories inadequate, to this task. Those which may be developed in the future and which may suffice may well enunciate new laws of quite a different sort from those now fruit-

ful in physics and chemistry. As Schroedinger suggests, in his admirable little book *What is Life?*, living activity may eventually come to be explicable in physico-chemical terms, but (he says) "we must be prepared to find it working in a manner that cannot be reduced to the ordinary laws of physics." It is guided "by a 'mechanism' entirely different from the 'probability mechanism' of physics," and therefore "we must be prepared to find a new type of physical law prevailing in it."[19] I should hazard a guess that when the new type of physical law is discovered it will turn out to be a law of teleological causation, in the sense that I have earlier proposed.

Perhaps we may conclude that the adoption of this view of teleology will prove fruitful not only in disposing of old disputes, but also in preserving the continuity of progression, in our conception of nature, from the physico-chemical to the biological, and from the biological (since our model for teleology was consciously directed action) to the psychological. To attempt by its means the solution of the body-mind problem might not be too presumptuous, but it would (mercifully) have to be reserved for a separate paper.

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A PROPOSED PROPERTY OF RELATIONS

THE logic of relations has had a somewhat curious history. The first systematic formulation of the logic of relations is generally credited to C. S. Peirce. After Peirce's formulation, a period of fifteen or twenty years elapsed during which most of the notions concerning relation were discovered and clarified, and one finds the concluding statements concerning these notions being made by Bertrand Russell. The paper which follows is an attempt to add to Russell's concluding statement.

It is easy to forget that most of the notions intrinsic to logic have an ancestry in language. In other words, logical notions have come about partly in the attempt to make language clearer. That certain logical notions have been found to have applications in areas other than language, notably in mathematics, does not affect the assertion that these notions trace their ancestry to ordinary language. Actually the notion of relation seems to be less far removed from its ancestry in everyday language than are some of the more sophisticated notions of modern logic, such as class and propositional function. Therefore it is doubly curious that research into the logic of relations has been so little developed.

[19] *Op. cit.* (Cambridge University Press, 1944), pp. 76, 79 and 81.

A possible explanation of why progress in the logic of relations has almost halted so short a time after its discovery is that relation itself is extremely difficult to define. Russell has devoted many paragraphs to one sort of definition or another, but it is unlikely that he would be insulted if one were to say that these attempts at definition are not entirely satisfactory. The following statements are paraphrases of Russell's definitions which have been taken from his *Principles of Mathematics* and from the *Principia Mathematica.*

1. "A relation between two terms is a concept which occurs in a proposition in which there are two terms not occurring as concepts, ..." [1]
2. A relation may be regarded for the purposes of logic as a class of couples, and a relation is therefore determined by its extension.[2]
3. ". . . the symbols other than variable terms, *i.e.* variable class concepts and relations, stand for intensions, while the actual objects dealt with are always extensions." [3]

It would be tedious to isolate all the difficulties which each of these definitions engenders. It is sufficient to say that in actual practice none of these definitions seems particularly useful, and an entirely different scheme is employed to define relation in general and also any particular relation. This scheme is, of course, the notion that relations possess properties or characteristics which determine, given any relation, what terms can stand in that relation and, given any collection of terms, what relations subsist between the terms. It will be recalled that at the beginning of this paper it was asserted that the logic of relations reached completion rather quickly. Additional support can now be mustered for this assertion. Granting that there are widespread differences of opinion as to just how these so-called properties or characteristics of relations are to be defined, it is remarkable that *there is such widespread agreement that the properties already enunciated are an exhaustive list.* It is true that certain properties, notably reflexivity, are denied by some, but no new properties of any importance have been presented since the beginning of the century.

Since the purpose of this paper will be to introduce for consideration a new distinction, applicable to relations, which will be

[1] B. Russell, *The Principles of Mathematics,* 2d ed. (New York, W. W. Norton, 1938), p. 95.

[2] A. N. Whitehead & B. Russell, *Principia Mathematica,* 2d ed (Cambridge University Press, 1925), Vol. I, p. 26.

[3] *Principles of Mathematics,* p. 99.

of the nature of a property, it will be necessary to recall some of the more important distinctions which have already been made concerning relations in order to provide a background for the new distinction. Relations are ordinarily distinguished in three different ways. In the first place a relation may be dyadic, triadic, octadic, . . . *n*-adic. Secondly, a relation may be one-one, one-many, many-one, or many-many. And finally, relations are distinguishable as to reflexivity, symmetry, and transitivity. In addition there are groupings of characteristics which result in hybrid properties such as aliorelativity and connexity. In whatever way one may choose to define the notion of relation itself, relations are almost universally thought of as having certain characteristics which, while these characteristics do not assign a meaning to a given relation, determine what kinds of entities can and cannot be so related. On the other hand, it is equally evident that the characteristics of a given class of entities play a part in determining the characteristics of the relations which subsist between the entities. For example, musical notes cannot be put into the family relations except by the wildest sort of metaphor, such as a music critic might employ when he says that the music of Beethoven fathered that of Brahms. From these considerations it can be concluded that there is a mutual interdependence between the notion of class and relation. This interdependence is very forcefully demonstrated by the analogies which Russell and Whitehead make between class and relation in the *Principia Mathematica*.[4]

Having mentioned the various characteristics of relations which have stood the test of time, we have now reached a position where it is possible to speculate on some additions to the catalogue of properties. This involves the drawing and the naming of a new distinction by means of which all relations can be categorized. This distinction will be termed a distinction as to constitutivity. Just as any relation is either symmetrical, a-symmetrical, or medio-symmetrical, so it is here being proposed that any relation is either constitutive, inconstitutive, or medio-constitutive. These terms have as yet no meaning so it will be necessary to state the definition at some length.

Following the standard practice in logic, a relation is designated by the symbolic notation aRb, where a is the referent, R is the relation, and b is the relatum. Now if a meaning is assigned to R, then a is a general expression for any member of a class which can be brought into the relation R with b, which is a general expression for the members of either the same class as a or a different class.

[4] *Principia Mathematica;* *21 is analogous to *20, *23 is analogous to *22, and *25 to *24.

When R is defined, the proposition *a*R*b* will be true or false depending upon what classes or members of the same class *a* and *b* are general expressions for. For example, if R is defined as 'father of,' then, according to the *Principia Mathematica* definition given above as definition 2, a class of couples has been defined. The couples are all the father-child combinations in the universe. This relation, however, could bear some further scrutiny, for as will be seen in a moment this is an example of a constitutive relation. It is constitutive because that there is such an entity *b* to which *a* bears relation R (fatherhood) says something about *a*. In ordinary usage one says that *a* is *the* father of *b*. One and only one man can be *a*, once the relation R is defined and a *b* specified. Obviously *b* could have more than one value. What is actually the case is that a constitutive relation such as '*a* is the father of *b*' is a definite description. The relation and the relatum constitute a definite description by uniquely determining the referent. There are, of course, many examples of constitutive relations. In mathematics, for instance, '*x* is the cube root of *y*' comes readily to mind. Further, it is interesting to note that the legendary "Scott is the author of *Waverley*" is a fine example of a constitutive relation. Given the book *Waverley* and the relation 'author of,' only one value may be assigned to the referent.

Some indication must now be given of the nature of inconstitutivity. Suppose the relation 'Charlottesville is south of Washington' is considered. Given Washington as an entity and the relation 'south of,' there are many cities which may be substituted as referent in the general expression *a*R*b*. Charlottesville is not *the* city south of Washington. Being south of Washington does not uniquely determine Charlottesville. It is true that the relation 'south of' defines a class of couples, to use again definition 2 above, but it is difficult to see how either the classes so defined or the couplings themselves are of the same nature or type as the type of coupling such a relation as 'father of' would determine. In short, the relation 'south of' is inconstitutive. 'Chicago is west of New York,' 'Thales came before Plato,' 'the chair is next to the table,' 'red is darker than pink,' '*a* succeeds *b*,' are also examples of inconstitutive relations. It is important to note concerning the last relation mentioned that '*a* is the successor to *b*' is constitutive and not inconstitutive.

There is a problem concealed in the assertion that 'south of' is inconstitutive which deserves mention. It might be possible to construe space, since 'south of' is a spatial relation, in such a fashion that 'south of' would be constitutive. Since this does involve, it

seems evident, certain definite presuppositions about the status of space, the problem can be ignored. However, there is a problem which arises when further specificity is added to the relation. Charlottesville is the city exactly 115.2389 miles southwest of Washington. This can only be understood as a constitutive relation depending on the establishment of certain other relations from which it is compounded. To summarize inconstitutivity, it can be said that an inconstitutive relation is one in which the relation and the relatum do not constitute a definite description of the referent.

The remaining category of relations typed as to constitutivity is the type which can be called medio-constitutive. Just as non-symmetric or medio-symmetric relations form an indeterminate class, so too are medio-constitutive relations an indeterminate class. 'x is the square root of y' is an example of a medio-constitutive relation in mathematics. If discourse is confined to positive numbers it is a constitutive relation, but if negative numbers are included every even root is inconstitutive since more than one number can be specified as an even root of any positive number. 'Mary is the sister of Jane' may be constitutive, in the case where there are only two girls in the family and no more children. However, if there are more children, the relation 'sister of' cannot be constitutive if one of the other children happens to be a girl. Rather than specifying this latter case as inconstitutive it seems preferable to leave such a relation denominated as medio-constitutive.

Having thus given a few examples of the constitutivity distinction, the task of supporting it now requires attention. To begin with, it is difficult to give a logical justification for such a thing as a property or characteristic of relations. The properties of relations seem to be quite boldly assumed in order to make logic work, to organize thought, and to generalize certain operations in logic in order to make a notational or symbolic system more efficient and workable. Therefore, justifying such a thing as the constitutivity distinction would seem to be mainly a task of pointing out its convenience and indicating some of its applications.

The easiest way to approach this would seem to be a point or two about the name 'constitutive.' A constitutive relation is one in which the relation itself conditions the referent. This is not to say that the relation plus the relatum is identical with the referent in a constitutive relation, but it does say that there is a functional relationship between the relation and the relatum on the one hand, which makes an existential assertion about the referent on the other hand. This situation is not present in an inconstitutive relation. Another fact is evident concerning what is here being called a con-

stitutive relation. This is that constitutive relations are either one-one or one-many relations.[5]

With these observations in mind, coupled with the aforementioned statement equating constitutive relations with definite descriptions, some very suggestive consequences follow. A constitutive relation asserts the existence of something, either an empirical existence, for example, '*a* is the originator of *b*,' or a mathematical existence, for example, '*x* is the cube root of *y*.' Such an existential assertion rests on the assumption that certain elementary relations have been found to be true. This accords with the theory of definite descriptions found in the *Principia Mathematica*, where the authors take what is here called a constitutive relation and analyze it into its constituent propositions as an example of a definite description. Scott is the author of *Waverley* depends on at least three elementary propositions: one man wrote *Waverley*, only one man wrote *Waverley*, and that man was Scott.

An objection which has been raised against the notion of constitutivity as a characteristic of relations is that in explaining it one is forced to use *sentences* like '*a* is the father of *b*' when actually the sentence awkwardly expressed as '*a* fathers *b*' is more faithful to the relation which the sentence purports to express. This objection may be ignored by carefully drawing the distinction between the sentence and the relation and examining the relation itself. However, there is another class of relations, which might perhaps be termed dynamic, such as '*a* loves *b*,' '*a* produces *b*,' and the like. Simply given the relation and the relatum, it is impossible to tell whether the referent is uniquely determined or not. These relations can only be categorized as medio-constitutive and the task of defining them left either to postulates or to other factors in the situation in which such a relation is deemed to be expressive of a matter of fact.

The considerations which have been briefly summarized above, together with some other applications of the distinction, lead to a conviction that the distinction as to constitutivity is fully as important in handling relations in logic as is a distinction of symmetry. Constitutivity would require among other things an additional postulate in most sets which endeavor to define a relation as the basis from which to infer theorems concerning some class of objects. The distinction has numerous other applications, two of which can be suggested here. One of these is Bradley's attack on relations in the third chapter of *Appearance and Reality*. It is possible to demonstrate that Bradley's argument is applicable only to constitutive

[5] It might be possible to find support for many-one relations as being constitutive also; however, there are certain difficulties in this which at the moment the writer is unable to solve.

relations. The other application is the problem engendered by Russell's atomic and Wittgenstein's elementary propositions. Wittgenstein rejected the notion of elementary propositions in his later work, but since it appears after further analysis that only spatial and temporal relations are genuinely inconstitutive there seems to be some hope for reintroducing atomic propositions by insisting that simple inconstitutive relations are actually the atomic propositions of logic.

In conclusion, if constitutive relations are actually definite descriptions and make existential assertions based always on more elementary relations, there is a very genuine problem as to whether or not constitutive relations should be called relations at all. Strictly speaking, the simple notation aRb cannot symbolize a constitutive relation, since the R is not a simple symbol but assumes that other more simple relations have already been established. This is evident if a constitutive and an inconstitutive relation are compared. '*a* is the author of *b*' cannot be known to be true without verifying a host of minute relations ultimately between a particular hand and pen and sheet of paper at such and such a time. The inconstitutive relation: 'the book is on the table,' on the other hand, is immediately verifiable and does not seem to be compounded out of a host of lesser relations. In the case of constitutive relations the symbol R seems to be hiding a multitude of complexities.

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BOOK REVIEW

Intention. G. E. M. ANSCOMBE. Oxford: Basil Blackwell, 1957. ix, 93 pp. 10 s. 6 d.

Miss Anscombe's book is easily one of the best things to come from England in many years. It is a difficult book to read (it is divided into 52 short, closely-written sections, the main points or subjects of which are briefly summarized in the table of contents, but there is no division into chapters, and the reader must carry along the thread of the argument by himself); however, it is so rich in suggestion and example that it amply repays careful study.

One cannot, in a brief summary, do anything like justice to all Miss Anscombe's subtle and detailed discussions. I shall try to survey only what I take to be the main points made; numbers in square brackets refer to sections in the text.

I

The distinction between an intentional action and one which is not intentional does not lie in some state of mind, emotion, interior or exterior performance on the part of the agent. For consider: a man may be sawing a plank intentionally, but sawing an oak plank only unintentionally; and in none of these can we find anything which could determine the description under which the action is intentional. The words "all I'm doing is sawing a plank" may indeed pass through his mind; but: does he intentionally say them to himself? If so, the problem is reintroduced. Do they occur to him spontaneously? Words may occur in someone's mind without being true. [19, 25, 27.]

We walk into a room and see someone doing something. A description of what he is doing may come to mind, say X. [4.] We shall say: X is an intentional action if the agent's answer to the question "Why are you X-ing?" gives a reason for acting. [5.] But when does an answer to this question give a reason for acting?

To begin with, it does *not* give a reason for acting if it gives evidence for supposing X would take place. But this doesn't take us very far. Suppose I am asked "Why did you knock that cup off the table?" and I reply "I thought I saw a face at the window and it made me jump"; this is not evidence I was going to knock the cup off the table, and yet it is not a reason for acting. It may be said: here we have a cause, not a reason. But notice what a strange case of causality this is: "the subject is able to give the cause of a thought or feeling or bodily movement in the same kind of way as he is able to state the place of his pain or the position of his limbs." [5.]

We can single out a "class of things which are true of a man: namely the class of things which he *knows without observation*"—e.g., the position of his limbs. [8.] "It is not ordinarily possible to find anything that shows one that one's leg is bent. It may indeed be that it is because one has sensations that one knows this; but that does not mean that one knows it by identifying the sensations one has." [28.] In these cases there is no "separately describable sensation" (no "separable" sensation), the having of which is our criterion for saying these things are so; if one might speak of the sensation one has when one's knee is bent, one would never at any rate say, e.g., "Being told startling news gives one that sensation," which one might say of, e.g., "the sensation of going down in a lift."[1] [8.]

[1] Cases of knowledge without observation are cases of *knowledge*, and hence in this respect unlike, e.g., my being able to say where my pain is. If a man says his leg is bent when it is straight, what he says is wrong, not

Now the class of intentional actions is a sub-class of the class of things known without observation. [8.] We shall return to this point below.

And the class of things known without observation sometimes also includes the cause of a movement as well as the movement itself —e.g., in the case cited above. Of course I did observe what I took to be a face at the window; but I did not observe it making me jump. [8.] Wherever a cause is known in this way, it will be called a "*mental* cause"; mental causes are possible for feelings and thoughts as well as for actions. [10.] A mental cause need not be a mental event, but if it is not, it must at any rate be perceived by the person affected. [11.] Neither intentions nor motives are mental causes. [11–14.]

To return to our problem, the answer to our question "Why?" does *not* give a reason for acting if it gives evidence, or states a cause, including a mental cause. [But see 15.] Or if it refuses application to the question, as in "I wasn't aware I was doing that," or "I only knew I was doing that because I observed it"; or as in any answer which indicates that the act was one in which there is no room for mental causality (e.g., a reflex kick). Or if it is of the sort "For no particular reason" (these actions are *voluntary* rather than intentional [49]). The answer *does* give a reason for acting, if it, say, mentions some past event which is not a mental cause (e.g., "Why are you killing him?" "He killed my father"); or if it mentions something future (subject to restrictions [22]); or if it gives a wider description of what one is doing (e.g., "Why are you moving your arm up and down?" "I'm pumping"). [6–22.]

And now we can say: "the term 'intentional' has reference to a *form* of description of events. . . . Events are typically described in this form when 'in order to' or 'because' [in the sense of reasons for acting] is attached to their descriptions. . . ." [47.]

An intentional action may also (though it need not [1]) be done with a further intention or aim; to get at this, we may notice that repeated application of our question "Why?" may elicit a series of wider and wider descriptions of what is being done. E.g., to continue the preceding example, "Why are you pumping?" "I'm replenishing the water-supply for the house," etc. In this way we may get a series of such descriptions A-B-C-D, each related to the next as description of means to end. At any point, the last term

unintelligible; if a man insists it is his foot that hurts, though he nurses his hand, etc., it is difficult to guess what he could mean. [8; but see also 25, and esp. 27.]

so far introduced is the intention so far discovered *with which* the action in its more immediate descriptions is being done. [26.]

A crucial objection that may now arise is: you speak of intentional actions as "know without observation"; but how can I be said to have such knowledge that I am, e.g., replenishing the water-supply for the house? Do I not have to discover by observation that this actually gets done? [28, 29.]

Consider a man going around town with a shopping list. What is the difference between the following relations: that between his list and what he buys, and that between what he buys and the list made by a detective who follows him? In the latter case, a discrepancy between the list and the items is a mistake in the list; in the former case, "the mistake is not in the list but in the man's performance. . . ." [32.]

What "modern philosophy has blankly misunderstood" is "what ancient and medieval philosophers meant by *practical knowledge.*" It is totally different from "contemplative knowledge," in which "the facts, reality, are prior, and dictate what is to be said. . . ." [32.]

To get at the nature of "practical knowledge," we must first understand "practical reasoning," or "practical syllogism." In discovering this, Aristotle had discovered "a completely different form of reasoning from theoretical reasoning, or proof-syllogism. . . ." But this fact has been concealed from us by misinterpretation. Consider an example from the *Nicomachean Ethics:*

> Dry food suits any human
> Such-and-such food is dry
> I am human
> This is a bit of such-and-such food.

The conclusion (often added by interpreters) "This food suits me" is indeed entailed by these premises; but unfortunately (for its being *practical* reasoning) I may well accept this without being inconsistent if I do not then take some of the food in question. Now we could alter the first premise in such a way that I *can* be accused of inconsistency if, accepting the premises, I do not take some of the food in question, e.g., to:

> Every human being needs to eat all the dry food he ever sees,

but (even assuming the correctness of the dietary theory) any such premise would be insane. "In short the 'universality' of Aristotle's universal premise is in the wrong place to yield the conclusion by way of entailment at all." Yet a man who goes through such considerations as the above, and ends up by eating some of the food in front of him, can certainly be said to be *reasoning.* [33.]

As we shall read it, the practical syllogism sets out the grounds for any action in which there is a purpose, i.e., where there is a calculation of means to ends, or of ways of doing what one wants to do. [38.] Hence, in the first premise something is characterized as in some way desirable (e.g., as "pleasant" or, as in our example, "suitable"); this characterization is such that there is no room for the question what you want something so characterized for (e.g., I can be asked what I want dry food for, but not what I want suitable food for). [35, 37, 38.] Thus the premises set out a way of getting or doing or securing the thing wanted; and the conclusion is an action (though we may invent a form of words to accompany it, such as "So I'll have some"). But the reasoning will only terminate in the action for someone who wants the thing in question—in our example, suitable food; for another, it might terminate only in "So eating this would be a good idea (if I wanted some suitable food)." [35.]

The claim is not that one always goes through such patterns of reasoning as set out in conformity with Aristotle's models; "the interest of [Aristotle's] account is that it describes an order which is there whenever actions are done with intentions"—i.e., an order in the immense number of descriptions which might be given of an action. [42, 43.] And we can now see that it is the same as the order arrived at independently above in discussing the intention *with which* an action is done. [42.] The question "What for?" which, in the end, elicits what is wanted, is a form of our question "Why?" And just as the questions "What for?" end once the action is characterized as desirable (e.g., "for the pleasure of it"), so also the chain of questions "Why?" comes to an end at this point (e.g., "it's pleasant"). [40.]

We can now return to the problem we faced above. To take an example: with my eyes shut I wrote "I am a fool" on the blackboard; now when I said what I was writing, ought I to have said "this is what I am writing, if my intention is getting executed" instead of simply "this is what I am writing"? [45.]

We should ask: how come we have this description "she wrote . . ." in the first place? We have no comparable description of a picked-out set of movements of the leaves of a tree. We have it because we already have the question "Why?": "the description of something as a human action could not occur prior to the existence of the question 'Why?', simply as a kind of utterance by which we were *then* obscurely prompted to address the question." [46.] I.e., there are many descriptions of what happens (e.g., he telephoned, called, signed, paid, sent for, married, etc.) which are

directly dependent on our possessing the *form* of description "intentional action" (see above, p. 33). [47.]

But this means, then, that many of our descriptions of what happens are of a type to be formally descriptions of executed intentions: i.e., they are descriptions of what happens which are expressible in the form "intentional action." And this means that "the failure to execute intentions is necessarily the rare exception." Of course people often do things for pleasure and get little or none, or for health without success; what is meant here is "a man's performance in its more immediate descriptions." [48; but see also 30.]

Now we can say: an event will not come under the description "execution of an intention" unless the agent has practical knowledge. For the execution of an intention is not merely the coming about of certain effects, but the coming about of effects whose descriptions (elicited by repetition of our question "Why?") exhibit the A-B-C-D (means-end) order discussed above. But this was the same as the order we found in our investigation of practical reasoning. And one who has practical knowledge is one who knows how to produce effects of this sort. And not merely to *say* how to produce them: this sort of knowledge is exercised in actually producing them. [48.]

So my knowledge of what I am writing with my eyes shut is practical knowledge; it is knowledge without observation, different from the contemplative knowledge of what is happening which I would obtain if I looked to see. [45, 48.] Of course what I say I am writing may not be getting written. But when it is not, the mistake is not in what I say, but in what I do; my knowledge is nevertheless the same. [45.]

II

If the reader thinks the last sentence above obscure as a solution to the problem raised, be it said: so does the reviewer. I should like to try in what follows to give a further interpretation of what happens in the case of these "mistakes in performance"—the remarks in the text are intriguing, but tantalizingly brief. But to begin with, we must take another look at "practical reasoning."

Miss Anscombe does not tell us much explicitly about the relation between the premises and conclusion in the practical syllogism as she sets it out—beyond reminding us that we do speak of reasoning here, and making use of such expressions as: desire *prompts* the action; if the thing described in the first premise is wanted, the reasoning *leads to* an action; it *terminates* in the conclusion. The one thing we are explicitly told is that the relation is not that of

logical entailment, for "the 'universality' of Aristotle's universal premise is in the wrong place to yield the conclusion by way of entailment." [33.] E.g., in the case of the example given, I simply may not now *want* any suitable food.

But suppose we add the premise "I want some suitable food." Though Miss Anscombe does not explicitly say so, her discussions in [38] and [44] lead one to suppose she would say: even if this *were* added, the conclusion would still not follow by entailment. For a man might accept these premises—and also accept another set, say, "Syrupy food suits any human; Such-and-such food is syrupy; etc.," and take the bit of syrupy food instead. Such a man could not be accused of acting in a way which is inconsistent with what he believes.

But was this man's choice of the syrupy food a reasoned choice? Suppose we ask him why he took it, and he replies "because it's suitable food"; then, I think, if what we are interested in is his taking some of the syrupy food *instead of* the dry food, and if it is clear that he knows both kinds are suitable, and if "because it's suitable food" is nevertheless *all* he can produce as an answer, I think we should say: he had no reason; it was arbitrary. And in fact Miss Anscombe has insisted all along that a man's action may be intentional under one description and not intentional under another; hence that he may have a reason for what he does under one description and no particular reason for what he does under another. *This* man seems to have a reason for what he does under the description, say, "taking something from the cupboard," but not under the description "taking some syrupy food *instead of* dry food."

But then the action under this last description is not the conclusion of any process of practical reasoning; it is not the conclusion of a practical syllogism. Hence cases such as these (others appear in [38] and [44]) are misleading. For we can now see that an action will not be the conclusion of a practical syllogism unless it is uniquely singled out by the nature of the want and the nature of the premises; i.e., under the description "taking some syrupy . . .," the action of the present example can be made out to be reasoned only if *either* the speaker thinks that syrupy food is the only kind of suitable food, etc., *or* what the speaker wanted was not just some suitable food, but, say, the suitable food which was in easiest reach (the relevant premise about what's in easiest reach also being required).

If this is correct, there seems all the less reason for claiming that what we are concerned with here is a "completely different form of reasoning from theoretical reasoning, or proof-syllogism. . . ."

[33.] There appear, in fact, to be three kinds of step involved in what Miss Anscombe calls "practical reasoning"; only the last is practical—but there is no reasoning in it.

The *first* step is from premises such as (A) "Dry food is the only kind of suitable food" and (B) "This is the only existing bit of dry food" to the conclusion (C) "This is the only existing bit of suitable food." That this step must be taken is clear: one who assented to A and B but did not see that C followed them might well want some suitable food and not take this which is in front of him. But it is unproblematic; one who says "A and B; so C" is performing a bit of deductive reasoning.

The *second* step is from (D) "I want some suitable food" together with C, to the conclusion (E) "I want this." Now this is not unproblematic; D and C may be true and E false[2]—if the speaker intends to deceive in saying C and E, though C is in fact true. Of course, such a speaker is not reasoning—he only pretends to reason—but the fact remains: where a man reasons "D and C; so E"[3] we lack a reason for saying his reasoning is deductive which we have in the case of a man who reasons "A and B; so C." Should we then introduce "I believe that" into C? This would be queer; one who reasons from D and C to E does not believe that he believes that C, he believes that C *simpliciter*. Further, we would not gain much in this way; the best we could say is: if D and C (expanded version) are true, E must *become* true, for it may take a man time to reason this out.

But because of this, one who says D and C cannot deny E; if he persists, we should begin to suppose not that he is unusual in his wants, but that he does not understand the words he uses. And there are probably those who would say, for this reason, that one who says "D and C; so E" is performing a bit of deductive reasoning. But in any case it is worth pointing out two things here: first, that there is this difference between the patterns "A and B; so C" and "D and C; so E"; and second, that it would be misleading for this reason to call the latter *practical* reasoning. For the same situation faces us whenever the conclusion of a bit of reasoning cannot be true unless the speaker takes it to be true, and one (or more) of the premises can be true though the speaker does not take it to be true. (Another example is the familiar "I believe that *p*; *p* implies

[2] Unless it is said: I can want a thing without knowing I do. The complications such a claim would necessitate in an account of acting are not dealt with anywhere here.

[3] It should not be said: no one reasons from D and C to E. We can easily imagine situations in which a man might offer "D and C; so E" as an explanation of his wanting a thing.

q; so I believe that *q*.") Of course it may be said: wanting (also believing, and the like) is something that I in a sense *do*—so after all there is something practical about this pattern of reasoning. But so also is "I waggle both my thumbs, so I waggle my right thumb" concerned with what I do. (See Miss Anscombe on the "mince pie syllogism." [33.]) Or again: the reasoning issues in action—and so after all it is practical. But "All humans are mortal; I am a human; so I am mortal" may issue in my taking out life insurance. In fact, the peculiarity of the pattern we are concerned with arises not because it issues in action, or because what I do is involved, but because my knowledge of a thing is.

The *third* step is from E to the action (taking some of this), accompanied or not by "So I'll have some." This is the only *practical* step in what Miss Anscombe calls "practical reasoning"; but I am not reasoning anything out in taking it. Nor is the relation here causal: we have not been concerned in any of the above with the wanting that is mere idle wishing, a mere prick of desire, but rather with the wanting, the "primitive sign" of which is *trying to get* [36]. Then why not speak of the action making the statement "I want this" true? It was one of Miss Anscombe's most interesting suggestions that there are cases in which the facts are not prior, do not dictate what is to be said or thought, but rather: what is said or thought is prior, dictating what the facts are to be. In "I want this, so I'll have some" it seems to me that we have the paradigm of such cases.

Now in Miss Anscombe's account, D does not appear as a premise; she suggests in [35] that "it is misleading to put 'I want' into a premise if we are giving a formal account of practical reasoning," her reason (so far as I can make it out) being that doing so may tempt us to suppose that "I want to do this, so I'll do it" is a case of practical reasoning, whereas it is not, for there is no calculation of means to end in it. But one may well grant that there is no calculation in this, while yet feeling that the result of omitting the premise "I want" is an unnecessary obscurity. In Miss Anscombe's account, "I want some suitable food" is (in some way; this is not set out) a presupposition of my statements A and B terminating in my performing the action.[4] It is as if one were told in another field: if you want to know how pressure on this button terminates in the ringing of that bell, just presuppose a wire connecting them.

[4] We may notice that the relation is even more obscure if the point made above is not granted; i.e., if the action is not uniquely singled out by the nature of the want and the nature of the premises. For then even the fulfillment of the presupposition does not guarantee that *this* bit of reasoning terminates in *this* action.

Be that as it may, we can now give a further interpretation of "mistakes in performance." This had to be postponed because it might at first have seemed that Miss Anscombe would allow here: a man assents to a certain set of premises, all of which are true, and he wants the thing described in the first premise—but he just fails to do the action in which the reasoning terminates, whether because he intentionally does something else, or because, though something happens other than the action in which the reasoning should terminate, it happens unintentionally. But we can now see that these are both impossible. If a man intentionally does something else, he did not assent to *these* premises or want *this* kind of thing. And if what happens happens unintentionally, we may notice *first* that not only must his X-ing be unintentional, but so must his action in all its more immediate descriptions (i.e., otherwise a false premise will be revealed—e.g., "I intentionally pressed my foot on the long narrow pedal, because I thought that was a way of stopping the car; I didn't know that when you do that, you in fact accelerate it"); and consequently, *second,* that this man does not *do* anything at all—in which case we can say again: he did not assent to these premises or want this kind of thing.

Then a "mistake in performance" must always be regarded as due to a false premise—even such cases as Miss Anscombe's "Now I press Button A," said as I press Button B [32]. And we *can* always set them out in the form of practical syllogisms with one or more false premises—but where something is *done* and it is *the* action in which the reasoning terminates. But of course where, because of the false premise or premises, what ultimately happens is not what was intended.

And now we can at last attempt an interpretation of Miss Anscombe's remark in [45]: "my knowledge would have been the same" even if something was wrong with the chalk, and what I said I was writing with my eyes shut didn't in fact get written. My practical syllogism is (in part):

It would be fun to write "I am a fool" on the blackboard with my eyes shut
To do this, first I have to set one end of a piece of (dry) chalk against the blackboard, and then . . .
The object in my hand is a piece of (dry) chalk
So I'll first set one end of the object in my hand against the blackboard.

Most usually, when I so reason, the thing actually in the end gets written; but on this occasion, one of my premises is false.

III

There has been no room here to discuss others of Miss Anscombe's very suggestive remarks—and in particular the notion of mental

causality and the topic of knowledge without observation in general. Her remarks here, and on "I want x" in [37] and on "I just want to" in [51], are especially called to the reader's attention.

One concluding remark: there will be readers who will say: now that we've been through all of this, what have we? What Miss Anscombe has done is to cut through a whole mass of philosophical clichés, and to give us a fresh, detailed picture of the concept of an action, and of related notions such as that of a reason for acting—and this in a way which brings out clearly the sources of a host of philosophical muddles in which one can find oneself in dealing with these concepts. To have done that is to have made a significant contribution to philosophy.

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NOTES AND NEWS

A memorial meeting for the late G. E. Moore, whose death on October 24, 1958, brought such a sense of loss to the philosophical world, will be held on January 15, 1959, at 4:15 p.m., in the Harkness Academic Theatre, Butler Library, Columbia University. The speakers will be Professor Alice Ambrose Lazerowitz of Smith College, Professor Morton White of Harvard University, Professor Martin Lean of Brooklyn College, and Professor Ernest Nagel of Columbia University.

At a meeting held at the Johns Hopkins University, Baltimore, on October 11, 1958, with Ambassador Luis Quintanilla in the chair, the Washington Philosophy Club adopted a resolution of homage to Professor Arthur O. Lovejoy on the occasion of his eighty-fifth birthday. Professor Lovejoy responded with remarks on the problem of agreement in philosophy, in which he said that what should be valued and sought was not merely agreement but reasoned agreement.

H. D. Lewis, Professor of the History and Philosophy of Religion at the University of London, is Visiting Professor of Philosophy and Religion at Bryn Mawr College for the current academic year.

Mr. G. E. L. Owen of Corpus Christi College, Oxford, and Professor Stephen F. Barker of the University of Virginia will be Visiting Lecturers on Philosophy at Harvard University during the Spring Term, 1959.

The new Officers of the Eastern Division of the American Philosophical Association are as follows:

President: Sidney Hook.
Vice-President: Gregory Vlastos.
Executive Committee, New Members: Monroe Beardsley, Albert Hofstadter.
Program Committee: Alan Anderson, Stuart Brown, Charles Frankel (Chairman), and the Secretary-Treasurer of the Division *ex officio*.

The next meeting of the Eastern Division will be held in December, 1959, at Columbia University.

The annual meeting of the Western Division of the American Philosophical Association will be held April 30, May 1, and May 2 at the University of Wisconsin. The deadline for volunteered papers is February 1, 1959. Symposia have been arranged upon aspects of the thought of Husserl and Dewey.

In an attempt to apply the work and results of the East-West Philosophers' Conferences held at the University of Hawaii in 1939 and 1949 to the general area of practical, social thought and action, the University of Hawaii will conduct a Third East-West Philosophers' Conference from June 22 to July 31, 1959, at the University of Hawaii in Honolulu, Hawaii. The theme of the conference is "East-West Philosophy in Practical Perspective." The purpose of the conference is "to consider the practical implications of comparative philosophy for cultural institutions as a basis of world understanding and co-operation."

The unique significance of this conference lies in the belief that real understanding can be achieved only through knowledge of the

fundamental convictions of the peoples of the East and West, in the effort to explore the philosophical basis of world understanding comprehensively and intensively, and in the attempt to promote more comprehensive perspective in the field of social philosophy as well as in the more technical areas of metaphysics and methodology. The work of the conference will be divided into six one-week sections as follows:

1. The Relation of Philosophical Theories to Practical Affairs.
2. Natural Science and Technology in Relation to Cultural Institutions and Social Practice.
3. Religion and Spiritual Values.
4. Ethics and Social Practice.
5. Legal, Political, and Economic Philosophy.
6. Conspectus of Practical Implications for World Understanding and Co-operation.

In conjunction with the conference eight special courses will be offered in the Summer Session of the University of Hawaii—two in Western philosophy, three survey courses in Asian philosophy (Buddhist philosophy, Chinese philosophy, Indian philosophy), and three comparative courses (Philosophy of Religion, Legal and Political Philosophy, and Ethics and Social Philosophy).

For further information write Charles A. Moore, Director, East-West Philosophers' Conference, University of Hawaii, Honolulu 14, Hawaii.

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